WHAT IS CLAIMED IS:

- 1 1. A monoclonal antibody or an antigen-binding fragment thereof reactive
- with in vivo produced advanced glycosylation endproducts (AGEs), which
- 3 monoclonal antibody or antigen binding fragment thereof demonstrates an
- 4 immunological binding characteristic of monoclonal antibody 4G9 as produced by
- 5 hybridoma 4G9, deposited with the American Type Culture Collection (ATCC)
- 6 and assigned Accession Number CRL 11626.
- 1 2. The monoclonal antibody or antigen-binding fragment thereof of Claim 1,
- 2 wherein the immunological binding characteristic is selected from the group
- 3 consisting of reactivity with serum-AGE proteins, serum-AGE lipids, serum-AGE
- 4 peptides, LDL-AGE, Hb-AGE, and collagen-AGE.
- 1 3. The monoclonal antibody of Claim 1 which is humanized or a chimeric
- 2 human-murine antibody.
- 1 4. The antigen-binding fragment of the monoclonal antibody of Claim 1,
- 2 selected from the group consisting of a single chain Fv fragment, an F(ab')
- 3 fragment, an F(ab) fragment, and an $F(ab')_2$ fragment.
- 1 5. The monoclonal antibody or fragment thereof of Claim 1 which is a murine
- 2 IgG isotype antibody.
- 1 6. The monoclonal antibody or fragment thereof of Claim 4 which is
- 2 monoclonal antibody 4G9 as produced by hybridoma 4G9, deposited with the
- 3 American Type Culture Collection (ATCC) and assigned Accession Number CRL
- 4 11626.
- 1 7. The monoclonal antibody of Claim 1 which is labeled.
- 1 8. A hybridoma that produces the monoclonal antibody of Claim 1.

- 1 9. A hybridoma that produces is monoclonal antibody 4G9 as produced by
- 2 hybridoma 4G9, deposited with the American Type Culture Collection (ATCC)
- 3 and assigned Accession Number CRL 11626.
- 1 10. A method for detecting the presence of advanced glycosylation endproducts
- 2 (AGEs) in a biological sample comprising the steps of:
- a) contacting a sample suspected of containing AGEs with the
- 4 monoclonal antibody or antigen binding fragment thereof of Claim 1 under
- 5 conditions which allow for the formation of reaction complexes comprising
- 6 the monoclonal antibody or antigen binding fragment thereof and the
- 7 AGEs; and
- 8 b) detecting the formation of reaction complexes comprising the
- 9 monoclonal antibody or antigen binding fragment thereof and AGEs in the
- 10 sample;
- 11 wherein detection of the formation of reaction complexes indicates the presence of
- 12 AGEs in the sample.
 - 1 11. The method of Claim 10 wherein the monoclonal antibody or antigen
- 2 binding fragment thereof is bound to a solid phase support.
- 1 12. The method of Claim 11 which further comprises contacting the sample
- 2 with a labelled advanced glycosylation endproduct (AGE) in step (a), and
- 3 removing unbound substances prior to step (b), and wherein the formation of
- 4 reaction complexes in the sample is detected by observing a decrease in the
- 5 amount of labelled AGE in the sample.
- 1 13. The method of Claim 11, wherein the formation of reaction complexes is
- 2 observed by detecting the binding of a labelled anti-AGE antibody to the complex
- 3 of the monoclonal antibody or antigen binding fragment thereof and the AGE.
- 1 14. The method of Claim 13, wherein the labelled antibody demonstrates an
- 2 immunological characteristic selected from the group consisting of reactivity with

- 3 serum-AGE proteins, serum-AGE lipids, serum-AGE peptides, LDL-AGE, Hb-
- 4 AGE, and collagen-AGE.
- 1 15. The method of Claim 10 wherein the monoclonal antibody or antigen
- 2 binding fragment thereof is labelled.
- 1 16. The method of Claim 10 wherein an AGE is bound to a solid phase
- 2 support.
- 1 17. The method of Claim 16, which further comprises contacting the sample
- 2 with an AGE in step (a), and removing unbound substances prior to step (b), and
- 3 wherein the monoclonal antibody or antigen binding fragment thereof is labelled
- 4 and the formation of reaction complexes in the sample is detected by observing a
- 5 decrease in the amount of label.
- 1 18. The method according to Claim 10, wherein the AGE is a low density
- 2 lipoprotein (LDL)-AGE.
- 1 19. The method according to Claim 10, wherein the AGE is hemoglobin.
- A method of detecting the level of advanced glycosylation endproducts
 - 2 (AGEs) in a biological sample comprising the steps of:
 - a) preparing a series of dilutions of a sample suspected of containing
 - 4 AGEs using known amounts of a dilution buffer;
 - b) contacting the diluted samples suspected of containing AGEs with
 - 6 the monoclonal antibody or antigen binding fragment thereof of Claim 1 under
 - 7 conditions which allow for the formation of reaction complexes comprising
 - 8 the monoclonal antibody or antigen binding fragment thereof and the
 - 9 AGEs; and;
 - 10 c) contacting a known amount of a labeled AGE to the monoclonal
 - 11 antibody or antigen binding fragment thereof, which labeled AGE binds to
 - the monoclonal antibody or fragment thereof not bound by the sample,
 - detecting the extent of formation of reaction complexes comprising the

- monoclonal antibody or antigen vbinding fragment thereof and labeled
 AGEs in the sample;
- 16 wherein detection of the extent of formation of labeled-AGE-antibody complexes is
- 17 inversely proportional to the level of AGEs in the sample.
- 1 21. The method according to Claim 20, wherein the AGE is serum-AGE
 - 2 proteins, serum AGE-lipids, serum-AGE peptides, LDL-AGE, hemoglobin-AGE,
 - 3 or collagen-AGE.
 - 1 22. A method for evaluating the level of AGEs in a biological sample
 - 2 comprising:
 - 3 (a) detecting the formation of reaction complexes in a biological sample
 - 4 according to the method of Claim 10; and
 - 5 (b) evaluating the amount of reaction complexes formed, which amount
 - of reaction complexes corresponds to the level of AGEs in the biological
 - 7 sample.
 - 1 23. A method for detecting or diagnosing the presence of a disease associated
 - 2 with elevated AGE levels in a mammalian subject comprising:
 - 3 (a) evaluating the level of AGEs in a biological sample from a
 - 4 mammalian subject according to Claim 19; and
 - 5 (b) comparing the level detected in step (a) to a level of AGEs normally
 - 6 present in the mammalian subject;
 - 7 wherein an increase in the level of AGEs as compared to normal levels indicates a
 - 8 disease associated with elevated levels of AGEs.
 - 1 24. A method for monitoring the course of a disease associated with elevated
 - 2 AGE levels in a mammalian subject comprising evaluating the level of AGEs in a
 - 3 series of biological samples obtained at different time points from a mammalian
 - 4 subject according to the method of Claim 19, wherein an increase in the level of
 - 5 AGEs over time indicates progression of the disease, and wherein a decrease in
 - 6 the level of AGEs over time indicates regression of the disease.

- 25. A method for monitoring a therapeutic treatment of a disease associated 1
- 2 with elevated AGE levels in a mammalian subject comprising evaluating the levels
- 3 of AGEs in a series of biological samples obtained at different time points from a
- 4 mammalian subject undergoing a therapeutic treatment for a disease associated
- with elevated AGE levels according to the method of Claim 19, wherein a 5
- decrease in the level of AGEs over time indicates an effective therapeutic 6
- 7 outcome.
- 1 26. A method for detecting the onset and/or monitoring the course of diabetes
- 2 comprising performing the method of any one of Claims 20 to 22.
- 27. 1 A method of treating a disease in a patient, one symptom of which is an
- 2 abnormal level of AGEs, comprising exposing the patient serum to an anti-AGE
- 3 antibody to form an anti-AGE antibody: AGE complex, and removing the complex
- 4 from the serum;
- 5 wherein said anti-AGE antibody comprises a monoclonal antibody of any
- 6 one of Claims 1-3 or 4.
- 1 28. The method of Claim 24 wherein said AGEs are selected from the group
- 2 consisting of Hb-AGE, LDL-AGE, IgG-AGE, serum-AGE proteins, serum-AGE
- 3 peptides, and urinary peptide-AGEs.
- 29. 1 A pharmaceutical composition comprised of a compound which is
- recognized by and binds to an anti-AGE antibody and inhibits the recognition of 2
- 3 AGEs by mammalian AGE receptors, in combination with a pharmaceutically
- 4 acceptable carrier;
- 5 wherein said anti-AGE antibody comprises a monoclonal antibody in
- 6 accordance with any of Claims 1-3 or 4.
- 1 30. A pharmaceutical composition containing an anti-AGE antibody in
- 2 combination with a pharmaceutically acceptable carrier;
- 3 wherein said anti-AGE antibody comprises a monoclonal antibody in
- 4 accordance with any of Claims 1-3 or 4.

- 1 31. The pharmaceutical composition of Claim 26 wherein said in vivo-produced
- 2 advanced glycosylation endproducts are selected from the group consisting of Hb-
- 3 AGE, LDL-AGE, IgG-AGE, serum-AGE proteins, serum-AGE peptides, urinary
- 4 peptide-AGEs, and combinations thereof.
- 1 32. The pharmaceutical composition of Claim 27 wherein said in vivo-produced
- 2 advanced glycosylation endproducts are selected from the group consisting of Hb-
- 3 AGE, LDL-AGE, IgG-AGE, serum-AGE proteins, serum- AGE peptides, urinary
- 4 peptide-AGEs, and combinations thereof.
- 1 33. A method of treating disease in a mammal, one characteristic of which is
- 2 an elevated level of AGEs, comprising administering to said mammal an effective
- 3 amount of the composition of either of Claim 26.
- 1 34. A method of treating disease in a mammal, one characteristic of which is
- 2 an elevated level of AGEs, comprising administering to said mammal an effective
- 3 amount of the composition of Claim 27.
- 1 35. A test kit for measuring the presence or amount of AGEs in an analyte,
- 2 comprising:
- a monoclonal antibody or an antigen binding fragment thereof,
- 4 which monoclonal antibody or antigen binding fragment thereof
- demonstrates immunological binding characteristics of monoclonal antibody
- 6 4G9 as produced by hybridoma 4G9, deposited with the American Type
- 7 Culture Collection (ATCC) and assigned Accession Number CRL 11626;
- 8 b) means for detecting the formation of reaction complexes between
- 9 the monoclonal antibody or antigen binding fragment thereof and AGEs;
- 10 c) other reagents; and
- 11 d) directions for use of the kit.
- 1 36. The test kit of Claim 32, wherein the monoclonal antibody or antigen-
- 2 binding fragment thereof which is characterized by an activity selected from the

- 3 group consisting of reactivity with serum-AGE proteins, serum-AGE lipids,
- 4 serum-AGE peptides, LDL-AGE, Hb-AGE, and collagen-AGE.
- 1 37. The test kit of Claim 32 wherein the anti-AGE antibody is irreversibly
- 2 associated with a solid phase.
- 1 38. The test kit of Claim 32 which further comprises a labelled anti-AGE
- 2 antibody, which labelled anti-AGE antibody is reactive with in vivo-produced
- 3 AGEs.

. 4. .

- 1 39. The test kit of Claim 32 which further comprises a labelled anti-low density
- 2 lipoprotein antibody.
- 1 40. The test kit of Claim 36, wherein the low density lipoprotein is ApoB.
- 1 41. The test kit of Claim 32 which further comprises a labelled AGE.
- 1 42. The test kit of Claim 32 which further comprises an AGE.
- 1 43. The test kit of Claim 39, wherein the AGE is bound to a solid phase and
- 2 the antibody is labelled.